

AMENDMENTS TO THE CLAIMS

Claims 1-17 (canceled)

Claim 18 (currently amended): A method of controlling an excimer laser unit to perform cornea ablation to reduce presbyopia, the ~~method comprising~~ method comprising the step of:

- a) controlling said excimer laser unit to produce on the cornea a photoablative pattern inducing a fourth-order ocular aberration;

wherein said induced fourth-order aberration is a spherical aberration; and

wherein said step a) further comprises the steps of:

- a1) acquiring and interpreting an aberrometric map of the eye indicating the visual defects of the eye, said visual defects comprising second-order visual defects including hypermetropia, astigmatism, and myopia, and higher-order visual defects including spherical aberration, thereby detecting a fourth-order spherical aberration;
- a2) if the detected spherical aberration is negative, supplying said excimer laser unit with an overcorrect photoablative pattern that results in an induced fourth-order positive spherical aberration after treatment, the overcorrect photoablative pattern being obtained by obtaining a photoablative pattern to correct a fourth-order spherical aberration that is increasing-it-increased numerically in absolute value from the detected fourth-order spherical aberration to obtain an overcorrect photoablative pattern inducing spherical aberration, resulting in an induced spherical aberration after treatment;
- a3) if the detected spherical aberration is positive, supplying said excimer laser unit with an overcorrect photoablative pattern that results in an induced

fourth-order positive spherical aberration after treatment, the overcorrect photoablative pattern being obtained by obtaining a photoablative pattern to correct a fourth-order spherical aberration that is changing its sign and increasing it opposite in sign and increased numerically in absolute value from the detected fourth-order spherical aberration to obtain an overcorrect photoablative pattern inducing spherical aberration, resulting in an induced spherical aberration after treatment; and

- a4) supplying the photoablative pattern to controlling said excimer laser unit for implementation to implement the overcorrect photoablative pattern on said cornea.

Claim 19-21 (canceled)

Claim 22 (previously presented): The control method as claimed in Claim 18;
wherein said step a) also comprises the step of:

- b) controlling said excimer laser unit to perform specific photoablative treatment related to the visual defect of the eye associated with the presbyopia.

Claim 23 (previously presented): The control method as claimed in Claim 22;
wherein said step b) comprises the steps of:

- c) if the visual defect of the eye is hypermetropia, controlling said excimer laser unit to perform the following operations:
- c1) ablation of a circular corona of maximum 6 mm inside diameter, maximum 9 mm outside diameter, and of such a depth as to compensate the spherical defect;

- c2) ablation with a customized ablative pattern to eliminate higher than second-order defects, with reference to aberrometric data acquired prior to the operation in the preceding point; and
- c3) if the above operations fail to achieve a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0, ablation with a customized ablative pattern to obtain even greater spherical aberration;
- d) if the visual defect of the eye is hypermetropia and positive astigmatism or hypermetropia and negative astigmatism, controlling said excimer laser unit to perform the following operations:
 - d1) cylindrical ablation, with the excimer laser unit set solely to the cylindrical defect, to bring the cylindrical defect close to zero;
 - d2) ablation of a circular corona of maximum 6 mm inside diameter, maximum 9 mm outside diameter, and of such a depth as to compensate the spherical defect;
 - d3) ablation with a customized ablative pattern to eliminate higher than second-order defects, with reference to aberrometric data acquired prior to the operation in the preceding point; and
 - d4) if the above operations fail to achieve a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0, ablation with a customized ablative pattern to obtain even greater spherical aberration;
- e) if the visual defect of the eye is myopia, controlling said excimer laser unit to perform the following operations:
 - e1) ablation to such a depth as to compensate the spherical defect; and

- e2) ablation with a customized ablative pattern to induce positive spherical aberration with a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0;
- f) if the visual defect of the eye is myopia and positive astigmatism or myopia and negative astigmatism, controlling said excimer laser unit to perform the following operations:
 - f1) cylindrical ablation, with the excimer laser unit set solely to the cylindrical defect, to bring the cylindrical defect close to zero;
 - f2) ablation to such a depth as to compensate the spherical defect; and
 - f3) ablation with a customized ablative pattern to induce positive spherical aberration with a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0;
- g) if the visual defect of the eye is emmetropia, controlling said excimer laser unit to perform:
 - g1) operations d2), d3) and d4), if the visual defect improves using a positive lens; and
 - g2) operations e1) and e2), if the visual defect improves using a negative lens;
- h) if the visual defect of the eye is positive astigmatism or negative astigmatism, controlling said excimer laser unit to perform:
 - h1) operation d1) to achieve emmetropia;
 - h2) operations d2), d3) and d4), if the visual defect improves using a positive lens; and
 - h3) operations e1) and e2), if the visual defect improves using a negative lens.

Claim 24 (previously presented): The control method as claimed in Claim 18, also comprising the step of:

- i) controlling said excimer laser unit to form on the cornea a photoablative pattern which also corrects higher-order aberrations.

Claim 25 (currently amended): ~~A~~ A controller for an excimer laser unit which performs cornea ablation to reduce presbyopia, the controller comprising:

- a) first control means that controls said excimer laser unit to form on the cornea a photoablative pattern inducing a fourth-order ocular aberration;

wherein said induced fourth-order aberration is a spherical aberration; and

wherein said first control means comprise:

- a1) aberrometric measuring means that acquires and interprets an aberrometric map of the eye indicating the visual defects of the eye, said visual defects comprising second-order visual defects including hypermetropia, astigmatism, and myopia, and higher-order visual defects including spherical aberration;
- a2) first photoablative pattern generating means which are activated, if the detected spherical aberration is negative, to generate an overcorrect photoablative pattern that results in an induced fourth-order positive spherical aberration after treatment, the overcorrect photoablative pattern being generated by generating a photoablative pattern to correct a fourth-order spherical aberration that is numerically increase-increased in absolute value from the fourth-order spherical aberration detected by said aberrometric measuring means and so generate a photoablative pattern inducing spherical aberration, resulting in an induced spherical aberration after treatment;

- a3) second photoablative pattern generating means which are activated, if the detected spherical aberration is positive, to generate an overcorrect photoablative pattern that results in an induced fourth-order positive spherical aberration after treatment, the overcorrect photoablative pattern being generated by generating a photoablative pattern to correct a fourth-order spherical aberration that is change the opposite in sign and numerically increase increased in absolute value from the fourth-order spherical aberration detected by said aberrometric measuring means and so generate a photoablative pattern inducing spherical aberration, resulting in an induced spherical aberration after treatment;
- a4) supply means that supplies the overcorrect photoablative pattern so generated to said excimer laser unit for implementation on said cornea.

Claim 26-29 (canceled)

Claim 30 (previously presented): The excimer laser unit controller as claimed in Claim 29;

wherein said first control means:

- c) if the visual defect of the eye is hypermetropia, control said excimer laser unit to perform the following operations:
- c1) ablation of a circular corona with a maximum 6 mm inside diameter and a maximum 9 mm outside diameter, and of such a depth as to compensate the spherical defect;
 - c2) ablation with a customized ablative pattern to eliminate higher than second-order defects, with reference to aberrometric data acquired prior to the operation in the preceding point; and

- c3) if the above operations fail to achieve a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0, ablation with a customized ablative pattern to obtain even greater spherical aberration;
- d) if the visual defect of the eye is hypermetropia and positive astigmatism or hypermetropia and negative astigmatism, control said excimer laser unit to perform the following operations:
 - d1) cylindrical ablation, with the excimer laser unit set solely to the cylindrical defect, to bring the cylindrical defect close to zero;
 - d2) ablation of a circular corona of maximum 6 mm inside diameter, maximum 9 mm outside diameter, and of such a depth as to compensate the spherical defect;
 - d3) ablation with a customized ablative pattern to eliminate higher than second-order defects, with reference to aberrometric data acquired prior to the operation in the preceding point; and
 - d4) if the above operations fail to achieve a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0, ablation with a customized ablative pattern to obtain even greater spherical aberration;
- e) if the visual defect of the eye is myopia, control said excimer laser unit to perform the following operations:
 - e1) ablation to such a depth as to compensate the spherical defect; and
 - e2) ablation with a customized ablative pattern to induce positive spherical aberration with a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0;

- f) if the visual defect of the eye is myopia and positive astigmatism or myopia and negative astigmatism, control said excimer laser unit to perform the following operations:
 - f1) cylindrical ablation, with the excimer laser unit set solely to the cylindrical defect, to bring the cylindrical defect close to zero;
 - f2) ablation to such a depth as to compensate the spherical defect; and
 - f3) ablation with a customized ablative pattern to induce positive spherical aberration with a coefficient of Zernike's polynomial Z_4^0 ranging between 0.1 and 1.0;
- g) if the visual defect of the eye is emmetropia, control said excimer laser unit to perform:
 - g1) operations d2), d3) and d4), if the visual defect improves using a positive lens; and
 - g2) operations e1) and e2), if the visual defect improves using a negative lens;
- h) if the visual defect of the eye is positive astigmatism or negative astigmatism, control said excimer laser unit to perform:
 - h1) operation d1) to achieve emmetropia;
 - h2) operations d2), d3) and d4), if the visual defect improves using a positive lens; and
 - h3) operations e1) and e2), if the visual defect improves using a negative lens.

Claim 31 (previously presented): The ~~excimer laser unit controller~~ as claimed in

Claim 25||,|| also comprising;

~~i) wherein the second-first control means that~~ also controls said excimer laser unit to form on the cornea a photoablative pattern which also corrects higher-order aberrations.

Claim 32 (previously presented): A method of reducing presbyopia, comprising the step of:

forming on the cornea a photoablative pattern inducing a fourth-order ocular aberration, resulting in a fourth-order ocular aberration after treatment.

Claim 33 (previously presented): The method as claimed in Claim 32; wherein said fourth-order aberration is a spherical aberration.

Claim 34 (previously presented): The method as claimed in Claim 33; wherein said spherical aberration is a positive spherical aberration.